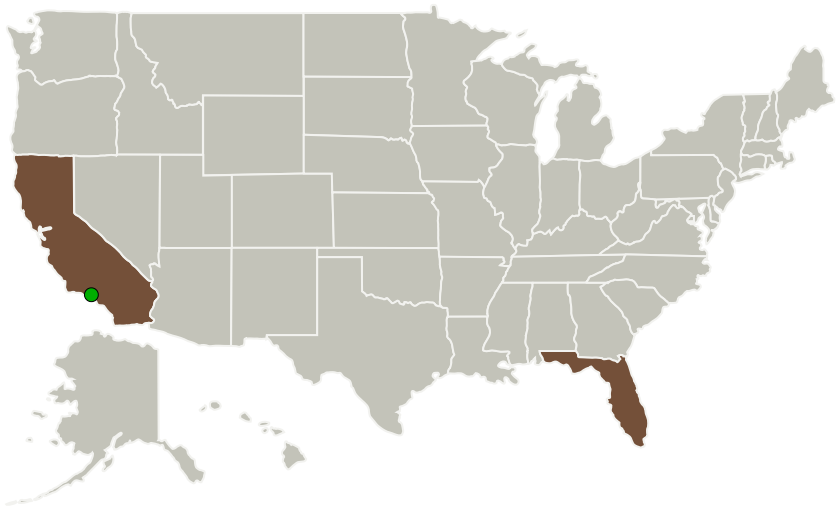
Demonstration of a Passive Thermal Management System for Cooling Electronics in Extreme Environments, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

Extended operation of exploratory systems on the surface of planets like Venus, means that techniques to cool system electronics to essentially room temperature (30ºC) while the ambient temperature is over 470ºC must be developed and demonstrated. This proposal discloses a patent-pending passive thermal management system (TMS) capable of providing electronic system cooling at 30ºC, while rejecting heat to ambient temperatures above 500ºC. This Phase I effort includes performance demonstration experiments in a representative thermal environment. These experiments will demonstrate a TMS system with a system mass of less than 0.22 kg/W/day, that provides passive isothermal temperature control, with no moving parts.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Mainstream Engineering Corporation	Lead Organization	Industry	Rockledge, Florida
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

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Primary U.S. Work Locations	
California	Florida

Project Transitions

February 2011: Project Start

August 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138075)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Mainstream Engineering Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

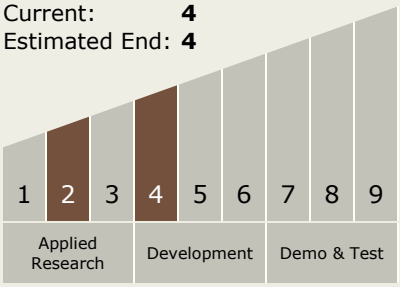
Carlos Torrez

Principal Investigator:

Robert Scaringe

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.3 Heat Rejection and Storage

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System